1   **1.** A method of aggregating a plurality of entries in a table in a database management system
2   into an aggregated entry, the method comprising the steps of:
3   making the aggregated entry, the aggregated entry representing the plurality of entries
4   and including a field whose value is a representation of a set that may have a plurality of
5   members; and

6   deriving members of the set from values contained in entries belonging to the plurality
7   thereof.

1   **2.** The method set forth in claim 1 further comprising the step of:
2   deleting the plurality of entries represented by the aggregated entry.

1   **3.** The method set forth in claim 1 wherein:
2   the representation of the set has a size which varies with the number of members in the
3   set.

1   **4.** The method set forth in claim 3 wherein:
2   The representation of the set represents the set as a character string wherein each
3   member is represented by a sequence of characters and the sequences of characters are
4   separated by a separator character.

1   **5.** The method set forth in claim 1 wherein:
2   the representation of the set has a size which is constant regardless of the number of
3   members in the set.

1   **6.** The method set forth in claim 5 wherein:
2   the representation of the set represents the set as a string of elements, there being an
3   element corresponding to each potential member of the set, the presence of a particular
4   member in the set being indicated by a first value of the corresponding element and the
5   absence of the particular member being indicated by a second value of the corresponding
6   element.

1   **7.** The method set forth in claim 1 wherein:
2   in the step of deriving members of the set, the values from which the members of the
3   set are derived are time values.

1   **8.** The method set forth in claim 1 wherein:

2   in the step of deriving members of the set, the values from which the members of the

3   set are derived are location values.

1   **9.** A method of rolling up event information that is practiced in a management system for a

2   database management system, the event information being contained in event entries in a table

3   in the database management system and including a time of occurrence for each event and

4   the method comprising the steps of:

5   making a roll up entry that represents a plurality of the event entries and includes a

6   representation of a set whose members are times of occurrences; and

7   deriving the members of the set from the times of occurrences in the plurality of event

8   entries.

1   **10.** The method set forth in claim 9 wherein

2   the roll up entry further includes an aggregated metric value and

3   the method further comprises the step of:

4   aggregating metric values in the plurality of event entries to produce the aggregated

5   metric value.

1   **11.** The method set forth in claim 9 wherein the method further comprises the step of:

2   deleting the plurality of event entries represented by the roll up entry.

1   **12.** The method set forth in claim 9 wherein:

2   The representation of the set represents the set as a character string wherein each time

3   of occurrence is represented by a sequence of characters and the sequences of characters are

4   separated by a first separator character.

1   **13.** The method set forth in claim 12 wherein:

2   the sequence of characters represents the time of occurrence as the sequence *<year>*

3   second separator character *<day_of_year>* second separator character *<second_in_day>*.

1   **14.** The method set forth in claim 9 wherein

2   the representation of the set has a first portion in the entry that is used until no more

3   members can be placed therein: and

4   when no more members can be placed therein, the method includes the step of:

5   making a second portion of the representation in another table in the database

6   management system,

7   whereby space is made for further members.

1   **15.** The method set forth in claim 9 wherein:

2   the plurality of event entries represented by the roll up entry have times of occurrences

3   that are within a period of time.

1   **16.** The method set forth in claim 15 wherein:

2   the roll up entry includes a representation of the period of time.

1   **17.** The method set forth in claim 16 wherein:

2   the representation of the period of time includes a representation of a time that is a start

3   or end of the period of time and a representation of a length of time.

1   **18.** The method set forth in claim 9 wherein

2   the roll up entry further includes a representation of the number of events represented

3   by the roll-up entry; and

4   the method further comprises the step of:

5   counting the number of events represented by the event entries to obtain a total number

6   of events and setting the representation of the number of events to the total number of events.

1   **19.** The method set forth in claim 9 wherein

2   the plurality of event entries have one or more fields which have the same values in

3   each of the plurality of event entries;

4   the rollup entry includes a field which contains a digest of the values of the one or more

5   fields; and

6   the method includes the step of making the digest from the one or more fields.

1   **20.** The method set forth in claim 19 wherein:

2   the one or more fields specify a class of events to which the event that is specified by

3   each of the event entries belongs.

1   **21.** The method set forth in claim 20 wherein:

2   the one or more fields specify the class of events by specifying the source of the event

3   and a condition that caused the event.

1   **22.** The method set forth in claim 19 wherein:

2   the field from which the digest is made is a message describing the event.

1   **23.** A method of determining whether there is a relationship between different types of events

2   in a database system that employs roll up tables whose entries represent events that occur over

3   a period of time and that further include sets of occurrence times during the period of time,

4   the method comprising the steps of:

5   selecting a first roll up table entry for a first type of event;

6   selecting a second roll up table entry for a second type of event that represents the same

7   period of time as the first roll up table entry; and

8   determining whether there is a temporal relationship between at least some of the

9   occurrence times in the first roll up table's set of occurrence times and at least some of the

10   occurrence times in the second roll up table's set of occurrence times.

1   **24.** The method set forth in claim 23 wherein:

2   the roll up table entries further include a total number of occurrences value; and

3   the first roll up table entry and the second roll up table entry are selected by comparing

4   the total number of occurrences values to determine whether there may be a relationship

5   between the types of events represented by the first roll up table entry and the second roll up

6   table entry.

1   **25.** A data storage device, characterized in that:

2   the data storage device contains code which when executed by a processor performs a

3   method of aggregating a plurality of entries in a table in a database management system into an

4   aggregated entry, the method comprising the steps of:

5   making the aggregated entry, the aggregated entry representing the plurality of entries

6   and including a field whose value is a representation of a set that may have a plurality of

7   members; and

8   deriving members of the set from values contained in entries belonging to the plurality

9   thereof.

1   **26.** The data storage device set forth in claim 25 further characterized in that:

2   the method further comprises the step of

3   deleting the plurality of entries represented by the aggregated entry.

1   **27.** The data storage device set forth in claim 25 further characterized in that:

2   the representation of the set has a size which varies with the number of members in the

3   set.

1   **28.** The data storage device set forth in claim 27 further characterized in that:

2   The representation of the set represents the set as a character string wherein each

3   member is represented by a sequence of characters and the sequences of characters are

4   separated by a separator character.

1   **29.** The data storage device set forth in claim 25 further characterized in that:

2   the representation of the set has a size which is constant regardless of the number of

3   members in the set.

1   **30.** The data storage device set forth in claim 29 further characterized in that:

2   the representation of the set represents the set as a string of elements, there being an

3   element corresponding to each potential member of the set, the presence of a particular

4   member in the set being indicated by a first value of the corresponding element and the

5   absence of the particular member being indicated by a second value of the corresponding

6   element.

1   **31.** The data storage device set forth in claim 25 further characterized in that:

2   in the step of deriving members of the set, the values from which the members of the

3   set are derived are time values.

1   **32.** The data storage device set forth in claim 25 further characterized in that:

2   in the step of deriving members of the set, the values from which the members of the

3   set are derived are location values.

1   **33.** A data storage device, characterized in that:

2   the data storage device contains code which when executed by a processor performs a method

3   of rolling up event information that is practiced in a management system for a database

4   management system, the event information being contained in event entries in a table in the

5   database management system and including a time of occurrence for each event and

6   the method comprising the steps of:

7   making a roll up entry that represents a plurality of the event entries and includes a

8   representation of a set whose members are times of occurrences; and

9   deriving the members of the set from the times of occurrences in the plurality of event

10   entries.

1   **34.** The data storage device set forth in claim 33 further characterized in that:

2   the roll up entry further includes an aggregated metric value and

3   the method further comprises the step of:

4   aggregating metric values in the plurality of event entries to produce the aggregated

5   metric value.

1   **35.** The data storage device set forth in claim 33 further characterized in that:

2   deleting the plurality of event entries represented by the roll up entry.

1   **36.** The data storage set forth in claim 33 further characterized in that:

2   The representation of the set represents the set as a character string wherein each time

3   of occurrence is represented by a sequence of characters and the sequences of characters are

4   separated by a first separator character.

1   **37.** The data storage device set forth in claim 36 further characterized in that:

2   the sequence of characters represents the time of occurrence as the sequence *<year>*

3   second separator character *<day_of_year>* second separator character *<second_in_day>*.

1   **38.** The data storage device set forth in claim 33 further characterized in that:

2   the representation of the set has a first portion in the entry that is used until no more

3   members can be placed therein: and

4   when no more members can be placed therein, the method includes the step of:

5   making a second portion of the representation in another table in the database

6   management system,

7   whereby space is made for further members.

1   **39.** The data storage device set forth in claim33 further characterized in that:

2   the plurality of event entries represented by the roll up entry have times of occurrences

3   that are within a period of time.

1   **40.** The data storage device set forth in claim 39 further characterized in that:

2   the roll up entry includes a representation of the period of time.

1   **41.** The data storage device set forth in claim 40 further characterized in that:

2   the representation of the period of time includes a representation of a time that is a start

3   or end of the period of time and a representation of a length of time.

1   **42.** The data storage device set forth in claim 33 further characterized in that:

2   the roll up entry further includes a representation of the number of events represented

3   by the roll-up entry; and

4   the method further comprises the step of:

5   counting the number of events represented by the event entries to obtain a total number

6   of events and setting the representation of the number of events to the total number of events.

1   **43.** The data storage device set forth in claim 33 further characterized in that:

2   the plurality of event entries have one or more fields which have the same values in

3   each of the plurality of event entries;

4   the rollup entry includes a field which contains a digest of the values of the one or more

5   fields; and

6   the method includes the step of making the digest from the one or more fields.

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1   **44.** The data storage device set forth in claim 44 further characterized in that:

2   the one or more fields specify a class of events to which the event that is specified by

3   each of the event entries belongs.

1   **45.** The data storage device set forth in claim 45 further characterized in that:

2   the one or more fields specify the class of events by specifying the source of the event

3   and a condition that caused the event.

1   **46.** The data storage device set forth in claim 44 further characterized in that:

2   the field from which the digest is made is a message describing the event.

1   **47.** A data storage device, characterized in that:

2   the data storage device contains code which when executed by a processor performs a method

3   of determining whether there is a relationship between different types of events in a database

4   system that employs roll up tables whose entries represent events that occur over a period of

5   time and that further include sets of occurrence times during the period of time,

6   the method comprising the steps of:

7   selecting a first roll up table entry for a first type of event;

8   selecting a second roll up table entry for a second type of event that represents the same

9   period of time as the first roll up table entry; and

10   determining whether there is a temporal relationship between at least some of the

11 occurrence times in the first roll up table's set of occurrence times and at least some of the

12 occurrence times in the second roll up table's set of occurrence times.

1   **48.** The data storage device set forth in claim 48 further characterized in that:

2   the roll up table entries further include a total number of occurrences value; and

3   the first roll up table entry and the second roll up table entry are selected by comparing

4   the total number of occurrences values to determine whether there may be a relationship

5   between the types of events represented by the first roll up table entry and the second roll up

6   table entry.